

Texas Professional Home Childcare Association 2022

4th Quarter Self-instructional training

"Brain Development, SIDS and Shaken Baby"

2 training hours

Donated by: Rhonda Crabbs

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Brain Development

A newborn infant's skull is disproportionately large when we compare it with the infant's body size. The skull must be big enough to hold the brain, which is 25% of its adult weight at birth. The neonate's body, by comparison is typically only 5% of its adult size. When an infant reaches the age of two, the brain is almost 75% of its adult weight and the body is only about 20% of its adult size. The larger skull in infancy is important to help the developing brain have room to grow. When an infant goes for his well-baby checkup, the doctor will measure the head circumference because it provides a rough idea of how the brain is growing. The distance around the head typically increases about 35% within the first year of life.

The infant's communication system begins with nerve cells within the brain called neurons. Most neurons are created before birth with a peak production rate of 250,000 new cells per minute in mid-pregnancy. Some of these neurons are deep inside the brain and some are in the brain stem, which is the region that controls automatic responses such as heartbeat, breathing and temperature. Within the cortex, the brain's six outer layers are approximately 70% of the infant's neurons. The cortex is crucial for humans because about 80% of the human brain material is in the cortex and most thinking, feeling and sensing occurs within the cortex, although other parts of the brain are active.

An infant's area of his brain that regulates his breathing is called the subcortical area, and it develops first right after birth. As an infant's brain grows through his first two years, the cerebral cortex has structural and functional changes occurring at the same time and dependent of each other. The cerebral cortex allows for cognitive and perceptual development to occur not only during the first two years of life, but throughout life (Johnson, 2000). The prefrontal cortex is the area of the brain that regulates impulse control, planning and anticipation is the last part of the brain to develop (Berger, 2009). During infancy it is inactive and creates the situation where an infant is unable to stop crying due to being told to. For an infant to stop crying because he was told to requires the infant to be able to make a decision, which he is unable to due to his prefrontal cortex not being developed.

Between and in the brain areas, neurons are connected to other neurons by very intricate networks of nerve fibers called axons and dendrites. Each neuron has a single axon and numerous dendrites. These spread out like branches of a tree to meet other neurons. This connection between the axons and dendrites is called synapses. These are critical communication links within each human brain. Electronic impulses are sent through the infant's axons to synapses, which are picked up by the dendrites so that communication can occur.

Over the first two years of life, brain development progresses very rapidly. The first year of life, the infant's brain cells will increase to over the 100 billion that were present at birth. The increasing of brain cells stops by the end of the first year. At birth the brain cells we all have make connections and networks inside our brains depending on the

experiences that we participate in. With each experience, their brain's neurons send out connections that overlap each other. As the child has experiences with their environment and the people in it, the synapses start to form connections between the brain cells. When synapse that were formed already, are no longer needed due to different experiences, they will break away. Though this process happens throughout our life, during the first year the child's experiences set the foundation for ultimate connections to be formed (Zero to Three, 2000). By the time a child is two years old, they have at least 1,000 trillion brain synapses. The different synapses occur on different areas of the brain depending on the infant's experiences and interactions with others. Since the time in an infant and toddler's life where the brain is connecting so many synapses is temporary and not found at another time in the child's life it is called transient exuberance (Berger, 2009). During a child's second year of life, the existing brain cells enlarge.

Research has shown that each infant's brain develops in a physically different way. That is to say that each infant's individual experiences shape the way the connections are formed. There is a part of the connections that is formed by heredity, but the most important growth and development of the infant's brain cell connections come from the experience he/she has with their outside world. For most of the infants in our care, we become the outside world they spend the majority of time with.

The experiences that infants have influence the connections between brain cells and this is a very critical development of the infant's growth. These are the same connections we spoke about earlier called synapses. These connections form the basis of both short term and long term memory. Out of these synapses grow the infant's sensory experience. These include all five of the senses we have. Infants do not need fancy toys to help their brain grow and expand. The child will make sure to find items to listen to or watch that are easily available to them. This internal drive within the infant is called self-righting and it helps an infant to remedy deficits (Berger, 2009). It is this drive that infants have to stimulate their brain that helps it to develop and grow more synapse connections. Some of the major developments that depend on these connections are:

~emotional stability ~language and speech ~logic ~math skills ~vision.

The experiences that infants have with their outside world that involve the sense of sight create synapses in the occipital cortex of the brain. The experience that infants have with their outside world that involves the sense of hearing created synapses in the temporal lobe of the brain. The experience that infants have with their outside world that involves the sense of touch created synapses in the parietal cortex of the brain. The experience that infants have with their outside world that involves the sense smell created synapses in the frontal love of the brain. Experiences that involve several senses involve more parts of the brain and thus build stronger synapses. These

stronger synapses create stronger memories. When infants are exposed to multiple experiences, they are able to have a solid foundation for other experiences to be built upon.

Children who experience activities that are fun cause synapses to form in the limbic system of the brain creating a foundation for memory and continued learning. The activities that occur often create permanent connections. While every new experience the child has creates connections, the experiences that happen often will stay with the child's memory longer. To remain a part of the child's permanent brain circuitry, the connections must be strong. Each time an experience is repeated the infant's brain activates a network. With repeated activation, the networks of connections are strengthened and made long lasting.

We have all heard that we should talk and read to our infants throughout the day. Did you ever wonder why? Infants that are read to, and talked to often build strong brain cell networks that make it easy for them to develop language skills. Children that were seldom spoken to or read to as an infant will have the trouble of mastering language as they grow. Infants that are held, cuddled and played with a lot will build strong brain cell networks that will help with emotional development later in life. Infants that are carried are also more involved in what is going on around them and enjoy being exposed to more opportunities for learning.

Adults must make sure to provide an infant with experiences and interactions for the brain to develop in a manner that will help the infant become a successful adult. These experiences and interactions are expected and must occur for some of the brain to develop. Some of the experiences that occur are culturally divided but the importance is that each infant is exposed to the experiences that relate to their cultural and ethnicity. When infants have caregivers that are warm and love them, environmental experiences to see and hear and items to learn to manipulate then their brain will start to develop and create the correct synapse for that particular child. Adults must make sure that they are providing experiences for the infant, like hearing language in the home, so that the brain is able to make a connection to that specific sound. The infant's brain will prone away synapse that he does not need, and build strong connections between neurons for synapse because of the infant's experience in his cultural environment.

There are many aspects to brain development in the first year of life. It is important for adults to provide the infant with calm, relaxed first two years without the presence of undue stress influences on the infant. When the infant experiences undue stress his brain will start to produce an inappropriate amount of stress hormones in early life. These stress hormones might be over produced in situations where the infant is terrified often like in abuse situations. When this over production of stress hormones occurs in infancy, the child is unable to recognize and react normally to stress later in life. The consequences of this over production is that when the infant becomes an adult he might always be on alert, called hyper-vigilant or become flat emotionally which is means he will never have normal emotions like happy and sad.

So now that you understand how an infant's brain develops, let's talk more specifically about your role with infants. When the attachment and interactions of adults with infants are missing in an infant's early life, there can be lifelong damage as a result. Each brain region of humans follows a sequence of growth, connection and pruning off of unneeded synapses. When infants are showing curiosity, it is important for adults to encourage that in a safe manner. An infant will respond positively to what their brain needs to develop. This is shown by very young infants looking and listening to musical mobiles, strangers on the street and of course their caregivers.

Each infant has an inborn desire and drive to remedy deficits. This ability is called self-righting and is seen in infants in all countries. When infants are unable to have multiple toys or bright flashing lights on their toys, they will develop their brains by playing with whatever is in their sight or reach. All infant brains develop normally with human interaction. Infants need human touch and interactions more than anything else to develop their brain.

At one time, researchers believed that infant brains were influences only by genes and prenatal influences. Neuroscientists now understand that it is also the environmental experiences that occur that develop the infant's brain. An infant's response to an overstimulated brain is to cry. It is the brain's natural protection kicking in and adjusting to the experience. The infant brain will also adjust to under stimulation by seeking out items to see, touch or hear. The interactions that infants have with their parents, caregivers, societies and cultures can be credited or blamed for a child's emotion and actions.

Each infant has a sensitive period where certain development is primed to occur. The first two years of life are a sensitive period of many aspects of brain development. This is a time during which the brain needs some experience to develop normally. It is important to remember that some brain develop is maturation, experiences are very essential.

SIDS

As not only a child care provider but also a mother, I think one of the most devastating tragedies that anyone can go through is that of losing the life of one of their children suddenly. SIDS claims the lives of almost 2500 infants in the US in 2009 (nearly 7 a day), which is slightly higher than SIDS causes in other developed countries. The National Institute of Child Health and Human Development (NICHD) defines SIDS as the sudden death of an infant under one year of age, which remains unexplained after a thorough case investigation, which includes the performance of a complete autopsy, examination of the death scene and review of the clinical history of the infant (www.nichd.nih.gov). SIDS is a diagnosis of exclusion, assigned only once all known and possible causes of death have been ruled out. A medical examiner does not give the reason of death to SIDS easily or quickly. SIDS is only used as a cause of death after a thorough examination of the infant, including an autopsy, along with a history taken for the parents. The infant has had to be health before his death, and no trauma can be found. SIDS is the leading cause of death in infants under 12 months of age. SIDS deaths occur unexpectedly and quickly to apparently healthy infants, usually during sleeping periods but not always

SIDS can occur in any infant before they become 1 year old age. Most SIDS occurs between 2-4 months of age. Though the majority of SIDS cases happen during while an infant is asleep, SIDS has been documented while an infant is awake. Most cases occur during the winter months, but SIDS can occur at any time of year. There does seem to be a higher risk of certain infants that develop SIDS. Premature infants, overweight at birth or slow to gain weight, boys and infants born to substance abusing mothers are more at risk for SIDS than other infants. A mother who smoked during pregnancy or continues to smoke after the child is born seems to raise the risk of their infant passing from SIDS. Infants born to mothers that received insufficient health care while pregnant do seem to be at a higher risk for SIDS. Unfortunately at this time there is not a diagnostic test to identify individuals at risk. With SIDS there is usually little or no warning for the shocked caregiver that loses a loved infant.

About one in five SIDS cases occur while the infant is in the care of someone other than the parent. A condition we call "unaccustomed tummy sleeping" is when an infant who is used to sleeping on their back at home is suddenly placed on their tummy or side by a caregiver. The act of placing a child in "unaccustomed tummy sleep" increases the risk of SIDS by 18% in relation to other children.

All child care centers across the United States should have a Safe Sleep Policy that is a part of the orientation and required course work for all new teachers, not only for infant teachers. In the child care business there is often times when a caregiver from another room might be working with the infants. Our job as caregivers is to protect the children in our care, and for this reason everyone in a center must have training on keeping infants safe.

SIDS IS NOT!

- ~SIDS is not caused by immunizations.
- ~SIDS is not caused by child abuse or neglect
- ~SIDS is not caused by suffocation or choking
- ~SIDS is not contagious

SIDS occurs in all families regardless of race or socioeconomic levels. SIDS cannot be predicted and even with prevention, an infant is still at risk. By definition the cause of SIDS is unknown. It has been said that SIDS is probably the end result of many different processes. That makes prevention of SIDS a difficult task, but not impossible.

- Place babies on their back for sleep. Always position the baby on their back for nighttime and naptime. Do not place the baby on their stomach or side. Starting in 1992, the American Academy of Pediatrics (AAP) recommended that babies be put down to sleep on their backs instead of their stomachs and, in 1994, began the nationwide "Back to Sleep" campaign. SIDS deaths have significantly declined since 1994's "Back to Sleep" campaign.
- □ Place the baby on a tight-fitting mattress in a crib meeting current safety standards. Only ONE infant per crib! Do not use wedges or infant positioners since there is no research that supports their use to reduce SIDS. Check with your state licensing office to find out if your date of compliance is BEFORE the federal date. New crib requirements http://www.cpsc.gov/cpscpub/pubs/5023.pdf
- Don't put babies to sleep on soft mattresses, sofas, waterbeds, pillows, beanbags or other soft surfaces. Do not sleep with the infant.
- Remove all the fluffy and loose bedding from the sleep area. Pillows, quilts, comforters and stuffed toys should not be in the sleep area. If using a blanket, it should be thin. Place the baby in the crib with his feet at the foot, and tuck the blanket around the crib mattress, only as far as the baby's chest. Blankets and coverings can bunch up around the baby's face, which can cause potentially dangerous re-breathing of stale air. Also, make sure the baby's head is uncovered during sleep.
- Make sure the baby does not become over heated by wearing too much clothing, heavy bedding or too warm a room. Babies cannot regulate their own body temperature well, so the baby should be dressed in whatever clothing is comfortable to you as an adult. Remove outer wear (jackets, sweaters, hats) once inside so not to overheat the baby.
- ☐ Keep the environment smoke-free. No explanation needed I hope.
- ☐ Breast-fed babies are at lower risk for respiratory illnesses. The increase of SIDS during the winter months may be due to use of heavier bedding, over dressing

the baby, and increased respiratory infections which may be triggering events for a SIDS death. Support breast-feeding parents with encouragement, resources and a secure location to feed at your center.

- ☐ Create a healthy lifestyle yourself, your family and your infant. Pregnant mothers must not use drugs or alcohol and need to see their doctor for every prenatal visit.
- Offer infants a pacifier as they have been shown to reduce the risk of SIDS,
- ☐ Have supervised "tummy time" for infants that are awake to strengthen their muscles and for proper development.

As a new infant enrolls in your program, be sure to provide the parents with the center's safe sleeping policy. If there is a health reason that the infant is unable to sleep on their back, you must obtain a signed physician note explaining the medical condition, the time frame and how to put the infant to sleep. Keep this note in the child's file and make sure that all caregivers (including volunteers and substitutes) understand the child's situation. It is not a bad idea to also put a sign on the wall above the child's crib.

Caregivers must keep supervision of infants even when they are in their cribs sleeping. Keeping the lights on or only deemed allows for caregivers to be able to watch the infants as they sleep. Part of every center's emergency preparation plan must include the steps to be taken if an infant is found in their crib not breathing. This preparation must include practice (with a baby doll) by all members of the center.

Parents and caregivers who have lost a child to SIDS are in tremendous need of emotional support. Because no cause is found for the infant's death, many parents suffer from guilt feelings. These feelings may be aggravated by investigations of police or others who, by law, must determine the cause of death. Timing of a subsequent pregnancy is a concern for many parents after experiencing SIDS. A member of a local chapter of the National Foundation for Sudden Infant Death Syndrome may assist with counseling and reassurance to parents and family members.

Shaken Baby Syndrome

Shaken Baby Syndrome (SBS) is a term used by medical professionals and others to describe the constellation of signs and symptoms of an infant or small child being violently shaken. Shaken Baby Syndrome was introduced in 1972 in medical literature to describe the abuse that a child receives after an adult momentarily succumbs to the frustration of an infant's cries. The shaken that occurs to the infant or child impacts the head of the child. The upset infant stops crying because the blood vessels in the brain rupture and neural connections break; the result is often permanent brain damage, coma or death. In the United States, more than one in five children hospitalized for maltreatment are suffering from shaken baby syndrome (Berger, 2009).

There are many physical signs and symptoms of SBS. They range from less severe to death. Sometimes the consequences of a less severe case might not even be brought to the attention of medical professionals. The more severe cases cause severe neurological consequences or death in the child. With severe cases the child usually becomes immediately unconscious and suffers rapidly escalating, life threatening nervous system dysfunction. Remember that any of these injuries can lead to severe disability or death.

In the infant's first few months of life, their expressions are typically either pain or pleasure. When the new infant is being feed or being rocked to sleep, they often smile because they feel content. When the infant starts to become hungry, tired or scared they will start to express their emotions through crying and at time it becomes uncontrollable (Berger, 2009). It is an important aspect of caring for infant children to respond to these cues in a timely manner. When caregivers create a bond with the infant, it helps to reduce the chances of Shaken Baby Syndrome. The caregiver is able to read the infant's signs of discomfort and the infant is able to feel safe in the caregiver's arms. This is not to say that infants will never cry if there is an attachment because that is how infants communicate with the world.

The majority of shaken baby syndrome instances occur because a parent or caregiver becomes frustrated with a child, typically when the child is crying. The adults then shakes the crying infant and the infant may cease to cry because of the injury. The adult then starts to associate the "stop crying" with the shaking of the infant, and gives the adult a gratifying response for the next time the infant starts to cry. This becomes a cycle and creates the abuser to repeat the behavior. Sometimes the infant is shaken because the adult is stressed due to little sleep or busy schedule in the classroom. It is not prevalent but shaken baby syndrome can still be present due to a caregiver throwing a small child into the air vigorously, playing too rough or hitting too hard on the back through playful exchanges. The risk of shaken baby syndrome is lower in these situations; however the danger still exists.

Common symptoms of SBS

_	Letnargy
	Extreme irritability
	Decreased appetite
	Poor Feeding, or poor sucking and swallowing
	Vomiting for no reason
	Grab-type bruises on arms or chest (are rare but do occur)
	No smiles
	No vocalization
	Rigidity or posturing
	Difficulty breathing
	Seizures
	Head or forehead appears larger than usual
	Soft spot on head appears to be bulging
	Inability to life head
	inability of eyes to focus

So what happens when a child is shaken? There are issues with an infant or small child that has been shaken, even modestly. There is no "safe" amount of shaken that you can give a child. When an infant or small child is shaken the brain rotates within the skull cavity. It injures and/or destroys the brain tissue. When the shaking occurs, the blood vessels feeding the brain can be torn and this will lead to bleeding around the brain. The blood pools within the skull sometimes create more pressure and possibly cause additional brain damage. The back of the eye, retinal, commonly starts to bleed during the shaking.

NEVER, NEVER, SHAKE A CHILD!!

The repeated force is dangerous to all children; however more dangerous to infants and young children because their neck muscles are not fully developed and their brain tissue is exceptionally fragile. Infant's heads are relatively large and heavy, making up about 25% of their total body weight (Woolfolk, 2007). During a shaking, their neck muscles are too weak to support the head as it moves back and forth. The infant's brains are still immature and developing. It doesn't take much too easily injure the soft brain tissue. Due to the developing of the brain, the infants blood vessels in and around the brain are more susceptible to tearing then in older children or in adults.

As we all know children that are shaken have the great possibility of death. Even if that doesn't occur, there are many long term consequences the child must live with. Children with SBS might have learning disabilities that are not seen too much later in childhood. There are also physical disabilities such as blindness or visual problem, hearing impairment, and speech disabilities that might be seen quickly. Children with a history of SBS might develop behavior disorders, have seizures or even be diagnosed

with Cerebral Palsy.

It doesn't take long for consequences to be seen. The child may stop breathing or the breathing will be compromised. The child will become extremely irritable. The child might have seizures, or his arms and legs will become limp. The child will not be able to feed, suck or swallow and might even vomit. There is a decreased level of consciousness, and the heart might even stop. Then there is always the possibility of death.

For many years children that have signs of SBS have had caregivers explain that it was a fall from a bed or couch. So, can a short fall produce the medical findings of SBS? Dr. David L. Chadwick says that most child abuse pediatricians would say that a short fall of less than four and a half feet would not cause the trauma that SBS does. He also states that it would be unlikely that even a long fall of 10 feet would not produce the severe symptoms that are a part of SBS.

Taking care of a child can be very difficult work. The most effective way to prevent SBS is to educate parents, child-care providers, babysitters, family members and siblings of the dangers of shaking a baby. Also being aware of appropriate ways to help a baby stop crying is helpful. Infants use crying to communicate needs or sometimes relieve stress. The more relaxed you remain, the easier it will be to console the child. Babies are sensitive to the tension around them. Letting your frustrations turn to panic or anger can intensify the infant's crying. When you are feeling stressed, do not pick up the baby until you feel calm. You could sit down, close your eyes and count to 20. Try taking slow, deep breaths. You may be better off asking for another caregiver to take over for a while.

Some suggestions for a caregiver of a baby that is crying.

Check the baby's diaper and change it, if needed
Hold the baby against your chest and walk with him
make sure the baby is fed, and burped
Lay the baby down across your lap and rub or pat his back
make sure the clothing is not too tight
Hug and cuddle the baby gently
Sing or talk to the baby
Put the baby in a swing
Play soft music
Offer the baby a pacifier
Rock the baby gently, either in a rocker or by swaying back and forth
Take the baby outside for fresh air
Gently rub the baby's head
Reassure with soft words
Offer a noisy toy or rattle
Do slight knee bends while holding the baby

☐ Message the baby's body or limbs gently

- ☐ Gently touch the soft surfaces of the baby's face
- □ Take the baby for a stroller ride
- ☐ Swaddle the baby in a blanket

Infants are going to cry. It is how they communicate their needs and desires with adults. Remember, you cannot spoil an infant by holding them. If you have an infant that will not calm down, no matter what you try, it is time for a break. Ask your director to let you have a couple of minutes while she watches the children. Take a short break and then come back relaxed and calm. Infants feed off of our emotions and if you are frustrated, they will be too.

Resources

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Brain Development, SIDS and Shaken Baby Syndrome

Name (please print):	
Address:	
Phone Number:	
1. A newborn infant'sis disproportionately large when we comp with the infant's body size. a. Skull b. Legs c. Neither	are it
2. The infant's system begins with nerve cells within the brain neurons. a. learning b. communication c. motor	called
3. Within the, the brain's six outer layers are approximately 70% the infant's neurons. a. cortex b. child c. learning	s of
4 As an infant's brain grows through his first (it is a number) years, to cerebral cortex has structural and functional changes occurring at the same time and dependent of each other. a. five b. two c. one	
5. Theyear of life, the infant's brain cells will increase to over the 100 billion that were present at birth. a. seventh b. third c. first	0
6. As the child has experiences with their environment and the people in it, the synapses start to form connections between the brain cells. a. True b. False	

sy a. b.	By the time a child is two years old, they have at least trillion brain rnapses. 1,000 seven thirty			
a. b.	During a child's second year of life, the existing brain cells enlarge shrink move around in the child's head			
ar a. b.	Thethat infants have influence the connections between brain cells and this is a very critical development of the infant's growth. food experiences sleep			
 10. Which of the items listed below are major developments that depend on synapse connections. a. emotional stability b. language and speech c. logic d. all of the above 				
th le a. b.	Children who experience activities that are fun cause synapses to form in e_system of the brain creating a foundation for memory and continued arning. learning limbic funny bone			
a. b.	Infants that are read to, and talked to often build strong cell etworks that make it easy for them to develop language skills. brain vision hearing			
a.	All infant brains develop normally with human interaction. Infants need human touch ad interactions more than anything else to develop their brain. True False			

14. SIDS claims the lives of almostinfai day), which is slightly higher than SIDS causes in oth a. 10 b. 1000 c. 2500				
15. SIDS can occur in any infant before they become a. one b. two c. five	eyear old age.			
16. A condition we call "unaccustomed is used to sleeping on their back at home is suddenly a caregiver. a. tired b. tummy c. sad				
17. Which is SIDS caused by:a. Immunizationsb. Neglectc. Chokingd. None of the above.				
18. If there is a health reason that the infant is unable to sleep on their back, you must obtain a signednote explaining the medical condition, the time frame and how to put the infant to sleep a. physician b. parent c. grandparents				
19. Shaken Baby Syndrome (SBS) is a term used by to describe the constellation of signs and symptoms a shaken. a. never b. violently c. lovely	-			
20. It is an important aspect of caring for infant children cues in a timely manner. a. True b. False	en to not respond to their crying			

- 21. The more ______ you remain; the easier it will be to console a child that is upset.
- a. relaxed
- b. sad
- c. tense